

Sheet 6: Queues

1. Write a C# console program that demonstrates using a queue to implement the Radix sort of integer number in the range 0-999. Write the sorting code as a separate function in your application.
2. In a doctor cabinet, a doctor assistant receives patients as they arrive and register their arrival. He assigns each patient a priority number from 1 to 5 according to the state of each patient. A patient with the most urgent state is assigned a priority of 1 and the one with the least urgent state is assigned 5. When the doctor is idle, the assistant call the patient with highest priority to be served. If there are many patients waiting have the same priority, the one arrived first is served. Write a C# console program to help the assistant. The program should use a priority queue to log the patients as they arrive. At any moment, the assistant should able to do one of the following:
 - Register the arrival of a patient
 - Call a patient for service
 - End the service. At this moment, the program should print a report with the total number of patient registered and the total number of patient served. This report can be used by the doctor for accounting purposes.
3. Derive a Priority queue from the standard queue in the .NET class library. The derived queue should store items. Each item is specified by a name and a priority. The derived queue should implement two modified de-queue and peek functions that peek and extract items from the queue according to their priorities (the smallest is the highest priority), in addition to de-queue and peek standard functions. Write a C# console program that implement and test your derived queue.